CLAIMS

What is claimed is:

1. An apparatus equalizing a histogram using a cumulative distribution function (CDF) of an image, the apparatus comprising:

a model parameter estimator estimating parameters from the image using a Gaussian model;

an error function storing unit storing error function values based on a Gaussian distribution;

a CDF calculator calculating a CDF using one of the error function values from the error function storing unit and the estimated parameters; and

a histogram equalizer performing histogram equalization using the CDF.

2. The apparatus as recited in claim 1, further comprising a model parameter modifier modifying the estimated parameters and outputting modified parameters to the CDF calculator.

3. The apparatus as recited in claim 1, wherein the parameters estimated by the model parameter estimator comprise a mean and a variance.

4. The apparatus as recited in claim 1, wherein the CDF calculator calculates the CDF using an error function value from the Gaussian distribution comprising a zero mean and a unit variance.

5. The apparatus as recited in claim 1, wherein the error function storing unit comprises a look-up table.

6. The apparatus as recited in claim 1, wherein the error function storing unit stores the error function values with a zero mean and a unit variance.

7. An apparatus equalizing a histogram using a cumulative distribution function (CDF) of an image, the apparatus comprising:

a model parameter estimator estimating parameters comprising mean and variance, from the image using a Gaussian model;

an error function storing unit storing error function values based on a Gaussian distribution with a zero mean and a unit variance;

a CDF calculator calculating a CDF using the parameters from the model parameter estimator and the error function values from the error function storing unit; and

a histogram equalizer performing histogram equalization using the CDF calculated by the CDF calculator.

8. The apparatus as recited in claim 7, wherein the error function storing unit comprises a look-up table.

9. The apparatus as recited in claim 7, further comprising a model parameter modifier modifying the parameters, mean and variance, estimated by the model parameter estimator and outputting modified parameters to the CDF calculator.

10. The apparatus as recited in claim 9, wherein the model parameter modifier modifies the mean to adjust brightness of the image and modifies the variance to adjust contrast of the image.

11. An apparatus equalizing a histogram using a cumulative distribution function (CDF) of an image, the apparatus comprising:

a model parameter estimator estimating parameters comprising mean and variance, from the image using a Gaussian model;

an error function storing unit storing error function values based on a Gaussian distribution;

CDF calculators calculating CDFs using the parameters from the model parameter estimator and the error function values from the error function storing unit;

an image segmentation unit segmenting the image into subimages having a Gaussian distribution; and

histogram equalizers performing histogram equalization on the subimages provided from the image segmentation unit using the CDFs calculated by the CDF calculators.

12. The apparatus as recited in claim 11, further comprising model parameter modifiers modifying the parameters, estimated by the model parameter estimators and providing modified parameters to the CDF calculators.

13. The apparatus as recited in claim 11, wherein the error function storing unit comprises a look-up table.

14. The apparatus as recited in claim 12, wherein each of the model parameter modifiers modifies the mean to adjust brightness of the image and modifies the variance to adjust contrast of the image.

15. A method to equalize a histogram using a cumulative distribution function (CDF) of an image, the method comprising:

estimating parameters from the image using a Gaussian model;

calculating a CDF using the parameters and an error function value; and

performing histogram equalization using the CDF.

16. The method as recited in claim 15, wherein the error function value is based on a Gaussian distribution with a zero mean and a unit variance.

17. The method as recited in claim 15, wherein the parameters comprise mean and variance.

18. The method as recited in claim 15, wherein the estimating the parameters further comprises modifying the estimated parameters where the modified parameters are used to calculate the CDF.

19. The method as recited in claim 15, further comprising segmenting the image into subimages, each subimage comprising Gaussian distributions,

wherein the CDF is calculated with respect to each of the subimages, and the histogram equalization is performed by applying the CDFs to the subimages.

20. A method to equalize a histogram using a cumulative distribution function (CDF) of an image, the method comprising:

estimating parameters comprising mean and variance, from the image using a Gaussian model;

storing error function values based on a Gaussian distribution with a zero mean and a unit variance;

calculating a CDF using the parameters and the error function values; and

performing histogram equalization using the CDF calculated.